THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 37

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte HIROSHI ONODA

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Appeal No. 95-4622
Application 08/113,665[1]

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ON BRIEF

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Before THOMAS, KRASS and FLEMING, Administrative Patent Judges.

THOMAS, Administrative Patent Judge.

DECISION ON APPEAL

Appellant has appealed to the Board from the examiner's final rejection of claims 23 and 42 to 49. Appellant has

[1] Application for patent filed August 31, 1993. According to the appellant, this application is a continuation of Application 07/851,294, filed March 12, 1992, now abandoned.

canceled claims 1 to 22, 30 and 39. Claims 33 to 38, 40 and 41 stand withdrawn. The examiner has allowed claims 24 to 29 and claims 31 and 32. As a result of withdrawing another rejection, the examiner has also allowed claims 42 to 45. Thus, claims 23 and 46 to 49 remain for decision on appeal.

Representative claim 23 is reproduced below:

23. A semiconductor device comprising:

a semiconductor substrate having a principal surface; and,

a plurality of multilayer wirings each having a length and a width which extend along and parallel said principal surface of said semiconductor substrate, each of said multilayer wirings including opposite side surfaces each extending perpendicular to said principal surface of said semiconductor substrate, said opposite side surfaces each including recessed portions located at spaced apart predetermined length intervals of each multilayer wirings is decreased at each of said spaced apart predetermined length intervals, the length of each of the recessed portions being less than 0.5Fm;

each of said multilayer wirings including a laminate of a first conductive low melting point layer formed of at least aluminum and a second conductive high melting point layer.

The following references are relied on by the examiner:

Sliwa et al. (Sliwa)	4,847,674	Jul. 11, 1989
Okuyama	4,898,840	Feb. 06, 1990
Kumagai et al. (Kumagai)	4,941,031	Jul. 10, 1990

Amazawa et al., (Amazawa), “Selective Growth of Aluminum Using a Novel CVD System,” ***IEDM***, vol. 88, pp. 442-445 (1988).

Claim 23 stands rejected under 35 U.S.C. § 103 as being obvious over Sliwa alone. Claims 46 to 49 stand rejected under

35 U.S.C. § 103. As evidence of obviousness, the examiner relies upon Okuyama in view of Kumagai, further in view of Amazawa.

Rather than repeat the positions of the appellant and the examiner, reference is made to the various briefs and answers for the respective details thereof.

OPINION

Turning first to the rejection of claim 23 as being obvious over Sliwa, we reverse this rejection generally for reasons set forth by appellant in the briefs. The examiner's position essentially considers the claimed multilayer wirings to be met by the high melting point tungsten layer 10 with sidewall portions comprising aluminum as indicated by region 32a in the various forms of Figure 3, 4 and 5. The examiner's position is that the recessed portions of the claim relate to the depicted discontinuous sidewall portion 32a' and the gap therebetween identified as region 33 in Fig. 5C of Sliwa. The examiner also takes the position that the claimed multilayer wiring as just indicated with respect to regions 10 and 32a of Sliwa's various figures comprise a laminate.

We agree with the basic view of appellant that Sliwa essentially teaches a single layer wiring structure with sidewalls. We also agree with the appellant's view that the

artisan would not have regarded the sidewall regions 32a as being a laminate with respect to base or core region 10 in the various figures of this reference to the extent such is set forth in the independent claim 23 on appeal. Such a structural arrangement in Sliwa is not consistent with the ordinary and artisan's view that a laminate structure consists of plural stacked plates or layers. The horizontally-arranged layers in Sliwa are not laminates in the sense of claim 23 on appeal. As such, we must reverse the rejection of claim 23 under 35 U.S.C. § 103 in light of Sliwa alone.

Turning lastly to the rejection of claims 46 to 49 under 35 U.S.C. § 103 in light of the collective teachings of Okuyama in view of Kumagai, further in view of Amazawa, we sustain this rejection. Noting first that appellant has not argued the features of dependent claims 47 through 49, a study of Okuyama indicates, as asserted by the examiner, that the bit lines 12 in Figures 2 and 3 are comprised of a high melting point metal layer and an aluminum or low melting point layer laminate. Note at column 5, lines 8 to 11 and column 8, lines 10 to 35. Appellant admits such as indicated at the bottom of page 6 of the principal Brief on appeal.

As noted by the examiner, Kumagai shows that plural bit lines are located parallel to each other and, as indicated in Figure 1 of this reference, that contact holes 20 and 24 exist along these lines in what appear to be extended regions. The contact hole/extended regions in Kumagai are as claimed located at predetermined length intervals. Obviously, to the artisan, since both Kumagai and Okuyama relate to memory device structures, the artisan obviously would have chosen either approach with which to embody the contact holes. The alternative approach is set forth in Figure 2 of Okuyama where bit lines 12 have therein in an expanded region connection holes 11.

In assessing the collective teachings of the three references the examiner has indicated page 6 of the answer that "it therefore follows that the conductive lines which are in the contact holes have portions of narrower width and shorter length (each determined by the diameter of the contact hole)." From our reading of Okuyama, it appears that the examiner may have better stated the position by indicating that it follows that the two conductive lines which are around the contact holes have portions of narrow width and shorter length. As shown in Figure 2 of Okuyama there are two halves of the bit line 12 at each connection hole 11, one to the right and one to the left of the

hole 11 per se. This observation alone meets the broad language of claim 46 that there be "a plurality of narrow portions at predetermined length intervals," since there are two halves at each repetitive connection hole area 11. In the context of the normal manner in the art of making of memories in an array as best represented by Kumagai, it would have been apparent to the artisan that this just quoted language is met by the plural halves at each connection hole or via, as well as along the entire length of the bit line itself since there are plural contact holes known in the art to exist along each bit line.

Appellant's arguments with respect to this rejection are misplaced. That the contact hole may be filled with conductive material is inapposite since the claim is directed only to the levels of the wiring layer structures per se. The normal filling of the contact hole is beyond the scope of the claims on appeal and therefore such a teaching in the reference as relied upon is merely an additional teaching beyond that which is required by the claims. Appellant's argument at the middle of page 7 of the principal Brief on appeal relates to disclosed but unclaimed features relating to the disclosed purpose of intentional break off or cutting off of the low melting point conductive layer at the regions 14 in disclosed Figure 2. Additionally, that Okuyama

appears to indicate that both laminate layers of the bit line 12 have the plural narrow portions as explained earlier of independent claim 46 on appeal, these teachings clearly meet the limitation of a claim that one of the recited plural layers has such a region.

Inasmuch as the features of the dependent claims 47 through 49 are not argued by appellant and are met within the ambit of the collective teachings of the three references relied upon, we note particularly Amazawa's teaching with regard to the size of the narrow portions being less than 0.5 micrometers.

NEW REJECTION UNDER 37 CFR § 1.196(b)

Inasmuch as we have reversed the outstanding rejection of claim 23 under 35 U.S.C. § 103 in light of Sliwa alone, and the examiner has withdrawn the rejection of this claim in the answer upon the combination of Okuyama in view of Kumagai and Amazawa within 35 U.S.C. § 103, we hereby reinstate this rejection as it applies to claim 23 essentially for the reasons set forth with respect to our analysis of claim 46. Here, in the context of Okuyama's teachings there is clearly a laminate structure of plural layers of the type set forth at the end of claim 23 on appeal. Additionally, the feature of claim 23 of the recessed portions being located at spaced apart predetermined length

intervals is also met by the reasoning we have set forth with respect to claim 46. The plural recessed portions recited in this claim are met with respect to our analysis regarding the two halves of each bit line as they traverse or go around each contact hole or via as explained earlier.

Inasmuch as the current version of 37 CFR § 1.196(b) has been amended on December 1, 1997, to permit this panel to institute rejections for any pending claim, including allowed claims, we institute a new rejection of claims 42 to 45 under 35 U.S.C. § 103 over Okuyama in view of Kumagai, further in view of Amazawa as expressed with our reasoning as previously applied to previously rejected claims 46 to 49. Although independent claim 42 is substantially the same as independent claim 46, we note that claim 42's language relating to the plurality of first parts corresponds to the earlier identified regions between via holes in Okuyama or the contact hole regions such as 20 and 24 in prior art Figure 1 of Kumagai. The second parts as recited in independent claim 42 comprise the actual contact hole or via regions in the collective teachings of the three references themselves. As disclosed the plural second parts comprise both halves of the narrow region 14 as depicted in Figure 1 of the disclosed invention. In a similar manner, the two halves of the

bit line 12 extending around each contact hole 11 of representative Figure 2 of Okuyama correspond in a similar manner to that which is claimed. Obviously in accordance with our reasoning, the width of the second part as explained is smaller than the width of the first part, which first part width comprises the region between the contact holes. Additionally, the length of the second part, that is, the length of the contact hole regions of the collective teachings of the references is obviously less than the length of the regions between the contact holes.

SUMMARY

In summary, we have reversed the examiner's rejection of claim 23 under 35 U.S.C. § 103 but have affirmed a separate rejection of claims 46 to 49 under 35 U.S.C. § 103. Additionally, we have entered new grounds of rejection under the provisions of 37 CFR 1.196(b) of claims 23 and 42 to 45.

In addition to affirming the examiner's rejection of one or more claims, this decision contains a new ground of rejection pursuant to 37 CFR § 1.196(b)(amended effective Dec. 1, 1997, by final rule notice, 62 Fed. Reg. 53,131, 53,197 (Oct. 10, 1997), 1203 Off. Gaz. Pat. & Trademark Office 63, 122 (Oct. 21, 1997)).

37 CFR § 1.196(b) provides, "A new ground of rejection shall not be considered final for purposes of judicial review."

Regarding any affirmed rejection, 37 CFR § 1.197(b) provides:

> (b) Appellant may file a single request for rehearing within two months from the date of the original decision . . . .

37 CFR § 1.196(b) also provides that the appellant, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of proceedings (37 CFR § 1.197(c)) as to the rejected claims:

> (1) Submit an appropriate amendment of the claims so rejected or a showing of facts relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the application will be remanded to the examiner. . . .
>
> (2) Request that the application be reheard under § 1.197(b) by the Board of Patent Appeals and Interferences upon the same record. . . .

Should the appellant elect to prosecute further before the Primary Examiner pursuant to 37 CFR § 1.196(b)(1), in order to preserve the right to seek review under 35 U.S.C. §§ 141 or 145 with respect to the affirmed rejection, the effective date of the

affirmance is deferred until conclusion of the prosecution before the examiner unless, as a mere incident to the limited prosecution, the affirmed rejection is overcome.

If the appellant elects prosecution before the examiner and this does not result in allowance of the application, abandonment or a second appeal, this case should be returned to the Board of Patent Appeals and Interferences for final action on the affirmed rejection, including any timely request for rehearing thereof.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART; 37 CFR § 1.196(b)

JAMES D. THOMAS Administrative Patent Judge	)
ERROL A. KRASS Administrative Patent Judge	) BOARD OF PATENT) APPEALS AND) INTERFERENCES
MICHAEL R. FLEMING Administrative Patent Judge	)

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